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## Single Inline Memory Modules (SIMMs)


The *single inline memory module* or *SIMM* is still the most common memory module format in use in the PC world, largely due to the enormous installed base of PCs that use them (in new PCs, DIMMs are now overtaking SIMMs in popularity.) SIMMs are available in two flavors: 30 pin and 72 pin. 30-pin SIMMs are the older standard, and were popular on third and fourth generation motherboards. 72-pin SIMMs are used on fourth, fifth and sixth generation PCs.

SIMMs are placed into special sockets on the motherboard created to hold them. The sockets are specifically designed to ensure that once inserted, the SIMM will be held in place tightly. SIMMs are secured into their sockets (in most cases) by inserting them at an angle (usually about 60 degrees from the motherboard) into the base of the socket and then tilting them upward until they are perpendicular to the motherboard. Special metal clips on either side of the socket snap in place when the SIMM is inserted correctly. The SIMM is also keyed with a notch on one side, to make sure it isn't put in backwards.

The 30 pin SIMMs are generally available in sizes from 1 to 16 MB. Each one has 30 pins of course, and provides one byte of data (8 bits), plus 1 additional bit for parity with parity versions. 72-pin SIMMs provide four bytes of data at a time (32 bits) plus 4 bits for parity/ECC in parity/ECC versions. Package bit width is discussed in detail [here](#).

SIMMs are available in two styles: *single-sided* or *double-sided*. This refers to whether or not DRAM chips are found on both sides of the SIMM or only on one side. 30-pin SIMMs are all (I am pretty sure) single-sided. 72-pin SIMMs are either single-sided or double-sided. Some double-sided SIMMs are constructed as *composite SIMMs*. Internally, they are wired as if they were actually two single-sided SIMMs back to back. This doesn't change how many bits of data they put out or how many you need to use. However, some motherboards cannot handle composite SIMMs because they are slightly different electrically.

72-pin SIMMs that are 1 MB, 4 MB and 16 MB in size are normally single-sided, while those 2 MB, 8 MB and 32 MB in size are generally double-sided. This is why there are so many motherboards that will only work with 1 MB, 4 MB and 16 MB SIMMs. You should always check your motherboard to see what sizes of SIMMs it supports. Composite SIMMs will not work in a motherboard that doesn't support them. SIMMs with 32 chips on them are almost always composite.

 **Warning:** Lately, some 16 MB and 64 MB SIMMs have been seen that are composite. These can cause significant problems with some motherboards, since they are specified to support 16 MB SIMMs on the expectation that 16 MB SIMMs will all be single-sided. You may not be able to use double-sided 16 MB SIMMs in some systems, especially older or cheaper ones.

Most motherboards support either 30-pin *or* 72-pin SIMMs, but not both. Some 486 motherboards do support both, however. In many cases these motherboards have significant restrictions on how these SIMMs can be used. For example, only one 72-pin socket may be usable if the 30-pin sockets are in use,



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## **Dual Inline Memory Modules (DIMMs)**

The *dual inline memory module* or *DIMM* is a newer memory module, intended for use in fifth- and sixth-generation computer systems. DIMMs are 168 pins in size, and provide memory 64 bits in width. They are a newer form factor and are becoming the de facto standard for new PCs; they are not used on older motherboards. They are also not generally available in smaller sizes such as 1 MB or 4 MB for the simple reason that newer machines are rarely configured with such small amounts of system RAM.

Physically, DIMMs differ from SIMMs in an important way. SIMMs have contacts on either side of the circuit board but they are tied together. So a 30-pin SIMM has 30 contacts on each side of the circuit board, but each pair is connected. This gives some redundancy and allows for more forgiving connections since each pin has two pads. This is also true of 72-pin SIMMs. DIMMs however have different connections on each side of the circuit board. So a 168-pin DIMM has 84 pads on each side and they are not redundant. This allows the packaging to be made smaller, but makes DIMMs a bit more sensitive to correct insertion and good electrical contact.

DIMMs are inserted into special sockets on the motherboard, similar to those used for SIMMs. They are generally available in 8 MB, 16 MB, 32 MB and 64 MB sizes, with larger DIMMs also available at a higher cost per megabyte. DIMMs are the memory format of choice for the newest memory technology, SDRAM. DIMMs are also used for EDO and other technologies as well.

DIMMs come in different flavors, and it is important to ensure that you get the right kind for the machine that you are using. They come in two different voltages: 3.3V and 5.0V, and they come in either buffered or unbuffered versions. This yields of course a total of four different combinations. The standard today is the 3.3 volt unbuffered DIMM, and most machines will use these. Consult your motherboard or system manual.

A smaller version of the DIMM is also sometimes seen; called the *small outline DIMM* or *SODIMM*, these packages are used primarily in laptop computers where miniaturization is key.

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